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STORAGE

NOTES ON INDIAN MUSCIDÆ

1. CALLIPHORINÆ TESTACEÆ
2. RHINIINÆ

BY

RONALD SENIOR-WHITE, F.E.S.

Malariologist

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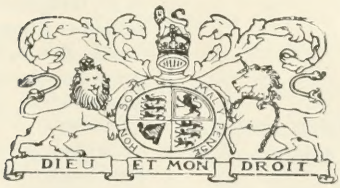

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NOTES ON INDIAN MUSCIDÆ.

BY

RONALD SENIOR-WHITE, F.E.S.,

Malariologist, The Kepitigalla Rubber Estates, Limited.

[Received for publication on 29th January 1923.]

1. NOTES ON THE MUSCIDÆ TESTACEÆ OF THE ORIENTAL REGION.

SHORTLY after my "Muscidæ Testaceæ of the Oriental Region[1]" had gone to press I received three small collections in this Group, which form the subject of the present paper. These have been sent me by the Imperial Entomologist (60 specimens), the Director, Zoological Survey of India (10 specimens), and the Royal Hungarian Museum, Buda-Pesth, *per* Major Patton of Edinburgh University (8 specimens), this last being part of the collections made in the East by Biro during the years 1898 to 1902, concerning which numerous papers by various authors have appeared from time to time. My thanks are due to Mr. Bainbrigge Fletcher, Dr. Annandale and Professor Kertész[2] for the opportunity they have afforded me of adding to our knowledge in this Group.

BENGALIA.

Bengalia jejuna, F. In the Pusa collection there are the following specimens. Pusa, 1 ♂ 5 ♀, between 30th May and 4th August of various years; 1 ♀, Burdwan, 1st August 1908; 3 ♂ 6 ♀, Chapra, no dates (*Mackenzie*); 1 ♂, Poona, 7th to 9th September 1919 (*Austin*); a ♀, labelled in Howlett's writing '11th September 1906,' is presumably from Allahabad, where Howlett was stationed at that time; whilst there is a ♂, without locality, labelled 'on cattle.' The Calcutta collection contains a single ♂ from Jabalpur, June-July 1922 (*Ribeiro*).

Bengalia jejuna var. *quadrinotata*, Big. This variety is evidently more common in North Bihar than is the typical form, though one or two specimens show intergrading in leg coloration. In the Pusa collection are 10 ♂ 9 ♀ from Pusa, between 12th June and September of various years; a pair from Chapra, no dates (*Mackenzie*); and a ♂, Paraiya, 9th August 1910, 'on pony,' (*D. M.*) It is not represented in the other collections. It will be recollected that the

[1] Senior-White, *Spolia Zeylanica*, Vol. xii, part 46, pp. 294–314.

[2] I regret to add that information has since been received of the death of Professor Kertész at the end of 1922.

specimens from which I redescribed it in my earlier paper[1] are from Banhar, in North Bihar, whilst the specimen seen by Bezzi and referred to in his paper of 1913[2] was from Calcutta.

Bengalia lateralis, Macq. In the Pusa collection are a ♀ from Pusa, 13th June 1920 (*Austin*); a ♂ from Purulia, 5th August 1908; a ♂ from Hoshiapur, 14th July 1909; a ♂ from Coimbatore, 12th December 1921 (*Fletcher*); and a ♀, no date, from Kala Dongi Road, Naini Tal. In the Calcutta collection are a ♂ from Chilka Lake, 'at edge on mainland near culvert 901,' 2nd November 1922; a ♀ from Trichur (Cochin), 1st to 4th October 1914 (*Gravely*); and 2 ♂ ♂ from Masuri and Coorg (*Hannyngton*), both without dates.

The collections of these three species present several points of interest. In the first place, in all of them the strength of the abdominal banding is the reverse of that laid down in my earlier paper, being almost absent in *jejuna* and its variety and very strong in *lateralis*. This being the exact opposite of my findings on Ceylon specimens, it can only be decided that separation based on this character is impossible, and females can only be correctly placed if males from the same locality, which can be at once distinguished on the fore tibial armature, are available for decision as to the type of banding obtaining in that locality. The determination of unrelated females in the foregoing distribution is in some doubt, therefore. Secondly, it will be noticed that North Indian specimens, with a single exception, have been taken entirely during the S. W. monsoon months, whilst those from South India, like the Ceylon specimens, date, with a single exception also, during the N. E. monsoon months. Now in the north this latter is almost non-existent, being represented, if at all, by the weak *Hathia* rains of October, and it may therefore be said that these species emerge and are on the wing only during the period of maximum rainfall in any locality*. Thirdly, two references, one to *jejuna* and the other to var. *quadrinotata*, refer to capture on animals. I have also received a specimen of the former from the Government Veterinary Surgeon, Ceylon, taken by his Assistant in Kandy as a 'cattle fly.' As Cragg[3] has shown, there is no trace of a biting apparatus in the otherwise remarkable proboscis, and it therefore becomes of interest to discover why these flies are, on occasion, taken on animals. Further observations on this point are required.

[1] Senior-White, *Spolia Zeylanica*, Vol. xii, part 46, pp. 294–314 (1923).

[2] Bezzi *Entomologische Mitteilungen*, ii, 75.

[3] Cragg *Indian Journal of Medical Research*, v. 516.

* [Since this memoir was sent to press, I have found a species of *Bengalia* on the wing at Bhim Tal in April 1923, during the dry weather.—T. B. F.]

Bengalia escheri, Bezzi. The Calcutta collection contains a single male from above Tura, 3,500—3,900 feet (Garo Hills, Assam), between 15th July and 30th August 1917 (*Kemp*), which agrees exactly with Bezzi's description of this species, which was described from Formosa. The following points are worthy of mention :—the femoral rings are not very distinct, and the hairs on the hind tibiæ are really only pubescence and hardly noteworthy, being much less prominent than those on the hind femora. The mid femoral serration, on which Bezzi lays stress, is merely the 'kamm' (*apud* Böttcher), present in varying degrees in all the species, in this case strongly developed and very closely set as to individual bristles.

Bezzi's "Group II" in the genus now becomes Indian as well as Far Eastern, but if my key to the Indian species be employed, the species will run out in couplet 2 and there separate on the vibrissal insertion being close to, instead of far above, the epistomal margin, on the darkened wings and prominent black facial fleck. This specimen is undoubtedly the most interesting discovery of the whole collection.

Bengalia surcoufi, White. Two females, Shillong, September 1920 (*Fletcher*), and Matheran, 8th July 1902 (*Biro*), are probably this species, but again I hesitate to distinguish definitely in the female sex between this species and my *bezzii*, as separation rests only on colour. *B. surcoufi* being a Himalayan species its occurrence in the Khasis is not surprising, and it is probably the *Bengalia* seen, and lost, by myself at Shillong the following month.[1] This was certainly not *B. escheri*, which must occur in the Khasis as well as the Garos, as the latter is so distinct a species that I should certainly have recognized my lost specimen in it when I saw Dr. Kemp's capture, had they been the same species.

Bengalia bezzii, White. In the Pusa collection a ♂ from Pusa, 18th August 1908 ; 3 ♂ from Chapra, no dates (*Mackenzie*) ; a ♂ from Dumraon, 15th September 1908 (*Chatterjee*) ; and two ♂ without data.

Bengalia varicolor, F. In the Calcutta collection a ♀ from mile 10—14, Cochin Forest Tramway, 28th and 29th September 1914 (*Gravely*), is almost certainly this species. I still await the discovery of a ♂ indubitably of this species to discover whether de Meijere's *latro* is valid or merely a colour variety of the Fabrician species.

Bengalia latro, Meij. In the Calcutta collection 1 ♂ 2 ♀ from Parambikulam (Cochin), 16th to 24th September 1914 (*Gravely*). Apparently this Javanese species is entirely confined in our region to the Ceylonese Province, and is on the wing there just before the arrival of the N. E. monsoon.

[1] Senior-White *Memoirs Agric.* (*Entom. Series*), VII, 100.

CAIUSA.

Caiusa testacea, White. The Biro collection contains an absolutely typical ♀ from Singapore, 1898.

The same collection has yielded the unique type of the following new species in this genus.

Caiusa nigronitens, sp. nov.

Female. *Head:* frons one-fifth of head width viewed from in front; frontal stripe brown, darkened laterally; parafrontalia dark silvery-grey. Face, parafacialia and cheeks silvery. Antennæ, second joint testaceous, third dark greyish; arista pale dirty brownish. Epistomal margin pale dull yellowish. Proboscis black, palpi yellow. About ten interior frontals, two exterior, of which the lower is the strongest. *Thorax:* disc shining black with hints of bluish posteriorly, some short white pollen anteriorly. Humeri yellow, pleura dark pollinose greyish, both spiracular areas yellow. Scutellum concolorous with mesonotum. *Chætotaxy:* Acrostichals 1 : 1 (presutural weak); Dorso-centrals 2—4; Humerals 3; Notopleurals 2; Presuturals 3; Anterior supra-alars 2 : 1; Postalars 2; Mesopleural fan of 6; Pteropleurals 3, small, in a bunch, but strong; Sternopleurals 1 : 1; Hypopleurals 6, in angled row scutellars, an apical, subapical and 2 marginal pairs. *Abdomen:* first apparent segment, except hind margin, pale yellow, remainder, and other segments, all shining black with a tinge of bluish. Venter yellow. *Legs:* Coxæ, fore and hind femora pale yellow, mid femora and all tibiæ and tarsi rather darker brownish. *Wings:* clear, veins yellowish, costal spine weak, third vein spinulose above and below one-third of distance to small cross-vein. Halteres and squamæ pale yellowish.

Long 7 mm.

Described from a unique female in good condition, Singapore, 20th to 26th January 1902 (*Biro.*). In the Royal Hungarian Museum, Buda-Pesth.

PARATRICYCLEA.

The following new species I place, with some doubt, in the above African genus, which thus becomes extended to the Orient also. If my generic location is correct, Matheran on the Western Ghats is exactly the place where one would expect to find in Asia an outlier of the African fauna.

Paratricyclea asiatica, sp. nov.

Male, female. *Head:* male eyes closely approximated, frontalia reduced above to a line, below forming an elongate triangle, castaneous, lightly striated

longitudinally ; parafrontalia dull silvery grey, the whole frons on its lower half elevated above the eyes, seen in profile. Ocellar triangle black, with brilliant yellow ocelli. About nine interior frontals. Female ; frontal width greatly exceeding that of an eye, nearly equalling both of these together, frontal stripe and ocellar triangle as in male, parafacialia rather more darkened. Exterior frontals two, rather weak, interior frontals strong, commencing at level of lowest interior frontal, though there may be an unpaired irregular one or so above this, (generic character). Lunule prominent, pale silvery. Face reddish, silvery pollinose, with very strong median carina, antennal ridges more golden, with only about three weak bristles above the vibrissæ, para-facialia dull pale golden-silvery, quite bare. Genæ concolorous below, laterally slaty-grey, but anteriorly with a big pinkish-brown patch, which is almost without pollen, sub-ocularly with numerous fairly long, fine hairs. Peristomal row of about nine strong bristles. Antennæ first two and base of third joint orange, remainder of latter dull silvery-grey, its length about three times that of second joint, first joint small ; arista yellow, except the thickened base of the second joint, black, plumose to tip above, but with only about six rays in the middle below. Palpi yellow, not clavate apically. Occiput dark. *Thorax:* dorsum dark grey with four irregular, blackish ill-defined stripes, pleuræ concolorous, the sutures yellow-brown ; scutellum dull yellow-brown, the whole with grey pollen. *Chætotaxy:* Acrostichals 1 : 1 (the presutural may be absent and there may be a second post-sutural). Dorso-centrals 2 : 3 ; Presuturals 3 ; Humerals 2 ; Notopleurals 2 (anterior may be wanting) ; Pre-alars 2 ; Intra-alars 2 ; Post-alars ♀ ; Mesopleurals 5 ; Sterno-pleurals 2 : 1 ; Hypopleurals 8, in angled row ; Ptero-pleuron with bunch of weak bristly hairs. *Abdomen* as long as head and thorax together, greyish with some yellow pollen and with black flecks, most apparent at posterior angles of the segments ; traces of a median black vitta. Apparent segments 2 to 4 with marginal bristles, on first of these only laterally. Sternites exposed. *Legs* yellow, tarsi blackened ; the submeso-tibial bristle on the interior face of the mid legs absent in the male. *Wings* clear, tinged yellow on fore margin, costal spine present, fairly strong ; third vein with only two or three weak bristles on basal node above and below, practically absent in male. Squamæ yellow.

Long 7-8 mm.

Described from 1 ♂ and 3 ♀, the former in good, the latter in fair condition, Matheran, 8th July 1902 (*Biro*). Type male, allotype and co-type females, in Royal Hungarian Museum, Buda-Pesth, co-type female in my own collection.

The bristly area of the facial ridges is so weak that the species might almost equally fall into de Surcouf's 'Group II' and run to the Far Eastern genus *Phumesia*, but against this is the very wide front and the almost non-bristly third vein.

In the collection of the Colombo Museum is a female specimen, in bad order, of an undescribed species, taken at Nuwara Eliya (Ceylon Montane Zone), which would also run out at *Paratricyclea*. It is, however, obviously not congeneric with the foregoing species, and has the dark, bristly appearance of a Tachinid. Until further specimens in good condition come to hand, I refrain from describing it, merely mentioning its existence here to indicate that the muster of the Oriental species of this Group is still far from complete.

2. NOTES ON INDIAN RHINIINÆ.

Since Townsend's[1] paper of 1917 no further information on the flies of this sub-family has been published, save a few descriptions of new species by myself. Having recently determined the collection, amounting to 285 specimens, accumulated since the inception of the Agricultural Research Institute, Pusa, in the laboratories of the Imperial Entomologist, as well as a few additional specimens sent me by the Director, Zoological Survey of India, and 19 specimens from the Royal Hungarian Museum, Buda-Pesth, collected by Biro, the following notes on the various species are offered. Some additional information has been drawn from my own collection in this group which amounts to over 200 specimens representing thirty species.

Whilst once again expressing my indebtedness to the Curators of these various collections for placing them at my disposal for study, I would express my especial thanks to Dr. Annandale of the Zoological Survey for loaning me for study certain specimens determined by Townsend, without which the elucidation of the species concerned would have been well-nigh impossible, owing to insufficient description. Only the sight of the actual specimens has prevented my falling into a serious error, which clearly proves how advantageous it is that specimens are not for ever immured within the walls of the Indian Museum, as is the case with the British Museum. Had Townsend's types been deposited at South Kensington instead of at Calcutta, growth of our knowledge of the Indian species would have been hampered for years to come.

I have given to specimens the names accorded to their species by Townsend and have described as new such species as do not appear in his

[1] Townsend. *Records of the Indian Museum*, xiii, 185.

paper, but it is necessary to point out that the literature of the sub-family contains a mass of descriptions by Desvoidy, Macquart, Walker and Bigot which are, of themselves, unrecognizable, and necessitate type-elucidation. When this has been undertaken by the writer during his next leave to Europe, workers must be prepared for a large amount of fresh synonymy in which, doubtless, many of Townsend's and my own names will be sunk in favour of those of earlier authors. It is impossible to imagine that many of the large, conspicuous, and fairly common species which both of us have described as new have escaped all description prior to 1917.

BORBORORHINIA.

Borbororhinia pubescens, Tnsd. 6 ♂ 1 ♀, Santikoppa (N. Coorg), 4th to 10th May 1914, 'attracted to opened *Eutermes* nest' (*Fletcher*); 2 ♂, Anamalais, 4,000 feet, 23rd January 1912, 'flying round exposed comb of *Eutermes*' (*Fletcher*).

The species can be obtained in quantity at any time, in my Ceylon experience, by opening the nest of one of the mound-building termites, though otherwise only seen as a great rarity on flowers. Males are chiefly attracted, but amongst them are a few females, which are quickly seized on by the males. They fly readily whilst *in cop.*, but I have managed to confine pairs so taken, and watched developments. The species is oviparous, the eggs white and large for the size of the fly, so their hatching within 24 hours is not surprising, indicating considerable embryonic development *in utero*. I have not been able to get the resulting larvæ to feed, and so have been unable to follow the life-history further. No trace of larger larvæ or puparia has been found among the fungus combs or in the galleries of the termite. After a few hours the exposed comb and fresh-cut earth ceases to attract specimens but if a nest be left half-opened one day, and be again cut into the next day, as soon as fresh earth and comb is exposed, specimens again appear in quantity.

COSMINA.

Townsend doubted whether this genus was Oriental at all. As de Surcouf[1] has subsequently shown, the Javanese *Phumosia fulvicornis*, Bigot, really belongs to it, whilst I now add thereto the following new North Indian species which is almost certainly a true *Cosmina*, veins I and II bearing bristles on the upper surface only, the former basally, the latter on the node only.

[1] Surcouf. *Nouvelles Archives Mus. Hist. Nat., Paris*, (5) vi, 117.

Cosmina indica, sp. nov.

(Plate III, fig. 6.)

Male, female. *Head*: frontal stripe rich brown, parafrontalia and ocellar triangle yellowish grey with black spots. In male frontalia reduced to a line, parafrontals distinct, width of frons over all at narrowest about that of second joint of antenna; in female frontal width at root of antennæ a full third of head width, not greatly narrowed above. Face and parafacialia ashy yellowish, the former shining, the latter often with dark spots on them and on genæ, especially in the male. Vibrissæ considerably above mouth border. Antennæ fulvous, third joint grey dusted, arista with yellow shaft, broadly plumose to two-thirds its length. Palpi luteous, spatulate. Occiput black, postocular margin pale greyish. *Thorax:* dorsum dully greenish-cupreous, almost hidden beneath whitish pollen, the whole thickly stippled with black dots. A pair of black dorso-central stripes, indistinct and more or less interrupted at and exteriorly displaced behind suture. Scutellum more shining green. Pleura as dorsum. *Chætotaxy:* Acrostichals 0 : 2; Dorsocentrals 2 : 4; Pteropleural strong; Sternopleurals 1 : 1; Scutellars 6, apicals crossed. *Abdomen* purplish cupreous, greyish pollinose, black stippled, with an obscure black median vitta. Irregular discals on apparent fourth segment. *Legs*: femora black, tinged metallic green; tibiæ yellowish brown, tips black; tarsi variable, yellowish brown to black. *Wings:* greyish, infuscated along fore margin, especially apically. Squamæ pale yellowish. Long 5-6·5 mm.

Described from 22 specimens, all in good to fair condition, taken at Allahabad, Lucknow, Chapra, Banhar, on various dates. Type male from Allahabad, 16th March 1906 (*Howlett*) and allotype from Banhar, 2nd August 1921 (*Inglis*). In my own and the Pusa collections. A greasy female from Lyallpur, 24th July 1917 (*Dutt*), also appears to be this species, which I cannot identify with any of the published descriptions of Walker and Bigot.

SYNAMPHONEURA.

Synamphoneura cuprina, Big. In the Pusa collection a ♂, 9th March 1915; a ♀, 5th May 1911, both from Pusa; 1 ♂ 4 ♀, Chapra, no date (*Mackenzie*); a ♂, Mercara (Coorg), 15th to 20th October 1915 (*Fletcher*); a ♀, Gudalur (Nilgiris, 3,000 feet), 19th September 1917; and a ♀, Lashio (Upper Burma), 6th October 1918. Two males from Kuala Lumpur (F. M. S.), no date, in Biro collection.

All the foregoing specimens, as well as a small series of both sexes from Banhar in my own collection sent me by Mr. H. A. Inglis, have the first

posterior cell open, whereas Townsend states that it is closed in the margin or extremely short petiolate. Specimens with the cell open would run to *Cosmina* by his key, and superficially the species is very like *C. indica*, described above, but can at once be distinguished by the shining black face which is lacking in the latter. The elucidation of these aberrant specimens was rendered possible by two specimens from Gauhati, in my own collection, in which the cell is closed. Examination of the male genitalia proved the two forms to be conspecific (Plate III, fig. 5).

IDIELLIOPSIS

Idiellopsis similis, Tnsd. In Pusa collection 3 ♀, March-April of various years, from Pusa; 3 ♂ 6 ♀, Chapra, no date (*Mackenzie*); a ♂, Coimbatore, March 1910; a ♀, Simla, May 1918 (*Fletcher*); and a ♂ from Maymyo (Upper Burma, 3,500 feet), 19th to 21st August 1914 (*Fletcher*). In the Biro collection a ♀ from Kuala Lumpur, without date. Dover [1] has recently recorded this species from Barkuda Island, Chilka Lake, Orissa.

RHINIA

Rhinia testacea, R. D. In Pusa collection a ♀, Kurseong, 7th to 20th June 1922 (*Fletcher*), and a ♀, Lower Lebong, 2nd to 9th June 1909 (*Howlett*), are the first Sikkim records for the species. A ♂, Bombay, 6th August 1918 (*Fletcher*), and a ♀, Sojitra (Baroda) (*Patel*). A ♀ from the Khasis, 1,000—3,000 feet, 20th May 1905, is another instance of a widely distributed species being found there and in Ceylon, not recorded by myself. The exact locality is uncertain; the damaged label appears to read 'Dumpep,' but this is impossible if the elevation is correctly stated. In the Biro collection a pair from Bombay, 27th March 1902.

Villeneuve[2] has recently stated that this species is merely a variety of *R. apicalis*, W., but for the present I retain the species as distinct, and give herewith a figure of the Oriental species' genitalia, for comparison with the African by those who have access to the latter (Plate IV, fig. 9).

STOMORHINA

Stomorhina lunata, F. In Pusa collection 3 ♂ 1 ♀, Bostan, Baluchistan "from locusts' eggs, June 1915 (*ex* Quetta Museum)." If this species is really a parasite of locusts in the egg stage, further study of its habits is certainly necessitated.

[1] Dover. *Records of the Indian Museum*, xxii, 396.

[2] Villeneuve. *Trans. Entomological Soc., Lond.*, (1921), 523.

IDIELLA.

Idiella mandarina, W. In Pusa collection: 5 ♂ 2 ♀, Pusa, in February to April of various years; 6 ♂ 2 ♀, Chapra, no date (*Mackenzie*); 2 ♂, 1 ♀, Allahabad, April, September, November, 1905-06 (*Howlett*); a ♂, Sojitra (Baroda), March 1915 (*Patel*); a ♀, Nagpur, March 1906; a ♂, Dadar, Bombay, 21st March 1905 (*Patel*); a ♀, Yercaud (Shevaroys, 4,500 feet), 17th to 21st December 1913 (*Fletcher*); 2 ♂, Cherambadi (Wynaad), October 1913 (*Howlett*); a ♀, Darjiling, August 1908 (*Middleton*). Appears to be mainly a Spring species in the Plains.

EUIDIELLA.

Euidiella discolor, F. In Pusa collection: 23 ♂, 26 ♀, Pusa, in all months of various years except April, June and July; 18 ♂ 9 ♀, Chapra, no date (*Mackenzie*); Allahabad, ♂, 5th October 1905, ♀, 13th November 1905 (*Howlett*); 2 ♂, Igatpuri, 9th October 1913; ♂, Bombay, 13th August 1904 (*I. R.*); labelled 'parasite on cattle' (*sic !*); ♂, Belgaum, 7th August 1910 (*Fletcher*); 2 ♂ 1 ♀, Telinkheri, Nagpur, 10th October 1911 "from white ants' nest"; a pair from Belgatchia (nr. Calcutta), 15th November 1906 (*Patel*); ♀ Bankipur, 25th October 1911 (*Fletcher*); ♀, Sidapur (Coorg), 13th and 14th May 1914 (*Fletcher*); 3 ♂, Abbottabad, 21st May 1915 (*Fletcher*); 1 ♂, 2 ♀, Kurseong, 7th to 20th June 1922 (*Fletcher*). In Calcutta collection is a ♀ from Ukhrul (Manipur, 6,400 feet), no date (*Pettigrew*).

The foregoing details contain one reference to termitophily. I have succeeded in rearing the species from larvæ found in an ants' nest,* (*Camponotus angusticollis*, Jerd.), found around the diseased roots of a rubber-tree on 7th April 1921. The tree was affected with *Botryodiplodia theobromæ*, and, the lactiferous system being dried up, was riddled with small boring beetles. The ants' nest, or rather the larvæ and pupæ, for there was no true nest, was among loose pebbly soil between the roots. In opening up *Borbororhinia pubescens* were attracted in numbers, also a single specimen of *Eu. discolor*, with a male *Musca ventrosa*, W., and a Tachinid. Amongst the earth were found two Muscoid larvæ, yellow-brown in colour, the posterior end with a crown of fleshy tubercles, not unlike those of a *Sarcophaga* if these were permanently everted. The pharyngeal skeleton was large for the larva, and heavily chitinized. They were strongly negatively heliotropic. Placed in some of the earth with larvæ and pupæ of the ant, 2 males and a female of *discolor* emerged on 18th and 19th of the month. The puparia were smooth,

* Determined by Mr. G. R. Dutt.

brown-red, with traces of the posterior processes of the larvæ. Only shrivelled vestiges of the ant material remained, appearing as if the larvæ had fed upon them. I have never succeeded in obtaining the early stages of the species again, though it is far the commonest Rhiniine Muscid in the East, and its life-history must be "about six feet away," as Farquharson phrased it.

Euidiella quadrinotata, Big. A ♀, without locality, bears a label in Howlett's writing "*Idia*, 8—9, unnamed in B. M."

Euidiella purpurea, Tnsd. In Pusa collection 4 ♂, 7 ♀, Buxar Duars, May 1907 (*Nowroji*); 5 ♂, Sidapur, March to May of various years (*Fletcher* and *Y. Rao*); ♂, Simla, October, 1908 (*Howlett*).

Euidiella nila, White. 17 ♂, 6 ♀, Kodaikanal, 7,000 feet, August to October 1921 (*Fletcher*). Originally described from the Nilgiris, this species seems to be confined to the Hill districts of the South of the Peninsula.

The Pusa collection contains a small series of the following new species :—

Euidiella termitophila, sp. nov.

Female. *Head:* frons about $\frac{1}{4}$ of head width; frontal stripe black, parafrontalia silvery, nearly obscured by black spots; parafacialia similar, face shining black. Antennæ dark brown, third joint thickly grey-dusted. Genæ grey with long pale pubescence. Palpi dark brownish. *Thorax*: obscurely metallic blue with black hair-bearing spots. Pleura similar, sternopleuron grey pollinose. A few conspicuous pale hairs on hinder margin of mesopleuron and on pteropleuron. *Abdomen*: basally yellow, probably completely so, if unstained. In all the specimens before me a varying extent posteriorly appears black, often one side or another of the apparent second and third segments is so coloured, leaving the other yellow; in all cases the apparent fourth appears darkened. *Legs*: yellow, tips of hind femora darkened. *Wings*: clear, veins yellow, halteres yellow, squamæ yellowish-white. Long 4·5—5 mm.

Described from 9 ♀, none in quite perfect enough condition to make the ultimate type, all paratypes, taken at Lashio (Upper Burma, 3,000 feet), on 23rd and 24th August 1914 (*Fletcher*); "attracted to opened *Eutermes* nest." In the Pusa and my own collections.

Euidiella unicolor, Tnsd. Townsend gives only a differential description of this species, but, thanks to the loan of one of his specimens by Dr. Annandale, I am able to draw attention to the omission of all mention of an apical infuscation of the wing, (though this probably varies in depth in individuals), and

can now offer the following table for the discrimination of the Oriental species of the genus :—

1. Femora always black (base of hind pair sometimes paler).....2
   Femora pale brownish-yellow.....*termitophila*, sp. n.
2. Front tibiæ pale, at least basally.....3
   Front tibiæ all black.....6
3. Abdomen all dark, without trace of yellow markings.....4
   Abdomen with some yellow markings.....5
4. Large species, thorax green, abdomen purple.....*purpurea*, Tnsd.
   Small species, abdomen dark green.....*unicolor*, Tnsd.
5. Abdomen luteous, with black median stripe of varying extent.... *discolor*, F.
   Abdomen black, with brown spots on 2nd and 3rd segments.... *quadrinotata*, Big.
6. Genæ and pleural stripe yellow.....*discolor* var. *nigripes*, White.
   Genæ and pleural stripe grey.....*nila*, White.

METALLEA

Metallea flavibasis, White. A ♀, Allahabad, 16th October 1905 (*Howlett*).

Thanks to the discovery in the Pusa collections of indubitably related females, I am able to undertake the description of a species hitherto known to me only from a few males, which I had hesitated to describe before lest these males prove only those of my *flavibasis*, of which the male is still unknown.

METALLEA NIGROFEMORATA, sp. nov.

Male, female. *Head:* male subholoptic; female, frons one-third of head width. Frons and face shining yellowish, in female ocellar area, parafrontalia and upper part of parafacialia silvery-yellow pollinose, much paler than the remainder, genæ concolorous, with pale hairs. Antennæ yellowish-brown, second joint brighter than the third, arista only microscopically pubescent. Palpi yellow, narrowly ligulate-clavate. *Thorax*: brownish, tinged with green or purplish, the green more distinct on the scutellum, the whole silvery pollinose. Pleura similar, but more silvery dusted. *Abdomen:* first three apparent segments yellow, with an obscure median dark vitta, fourth segment metallic purplish in certain lights, in others dark, with some white pollen. Discals lateral except on apparent fourth where they occur, irregularly, medianly, especially in the female, where they are noticeable amongst the regular hemimacrochætal vestiture. *Legs*: black, all tibiæ and metatarsi yellowish-brown, tips of former blackened. Femora with more or less grey dusting. *Wings*:

clear to lightly yellowish on fore margin, squamæ pale yellowish. Long 6·5–8 mm.

Described from 2 ♂, Suduganga, Matale, Ceylon; 3 ♂, Kurseong (Sikkim, 5,000 feet) (*Fletcher*); a ♀, Allahabad, 13th March 1906 (*Howlett*); a pair from Chapra, no date (*Mackenzie*). Type male from Suduganga, 9th November 1918, allotype female, Chapra, in my own collection. Co-types in my own and Pusa collections.

Only distinguished from *M. flavibasis* by the all-black femora, though the general appearance of the thorax is darker; lacks the metallic abdominal patches of *notata*, Wulp.

TRICHOMETALLEA

Trichometallea pollinosa, Tnsd. In Biro collection a ♂ from Trichinopoly, 8th March 1902; 4 ♂ 3 ♀ Dhond, 13th March 1902.

In my opinion the epistome of this species is so far forward-directed that the ordinary worker would locate the species in the first portion of Townsend's key. As regards its affinities, of course, it is correctly placed in the second. This point should be borne in mind when using the generic key given by Townsend.

THORACITES.

Thoracites abdominalis, F. 1 ♂, 2 ♀, Colombo, 28th February 1902 (*Biro*).

CHLOROIDIA.

Chloroidia flavifrons, Tnsd. In Pusa collection 4 ♂, Cherambadi (Wynaad), October 1913 (*Howlett*).

STRONGYLONEURA.

In separating and describing four species in this genus Townsend admitted to considerable doubts, but, after separating four forms corresponding to his four species, I find on dissection that the genitalia show specific differences, and that the species are all valid. All four, however, are very prominent species, and I doubt if any of the Townsend names will ultimately prove valid. The species may be separated on external characters as follows, but in every case I would recommend proof by genitalia examination, where males are concerned, as the external separatory characters are weak.

1. Parafacialia golden to brown 2
   Parafacialia grey ..... *carulana*, Tnsd.
2. Green species 3
   Purplish species, or with much white pile ..... *nebulosa*, Tnsd.
3. Facial hairs yellow ..... *nepalana*, Tnsd.
   Facial hairs black ..... *viridana*, Tnsd.

Strongyloneura nepalana, Tnsd. In Pusa collection a ♂, Muliyar (Palnis, 4,000 feet), 11th October 1921 (*Fletcher*); a ♀, Kodaikanal, October 1921 (*Fletcher*); a ♀, Valparai (*Anamalais*), 18th December 1917 (*Y. Rao*); 1 ♂, 3 ♀, Muktesar (Kumaon, 7,500 feet), September 1922 (*Fletcher*). The species is common in Ceylon, and is found also in the Khasis. (Plate II, fig. 1).

Strongyloneura nebulosa, Tnsd. In Pusa collection: 2 ♂, Gauhati, 4th June 1921 (*Mrs. Fletcher*); a ♂, Calcutta, 1st July 1904 (*per* C. V. D., Bengal); a ♀, Haflong (Assam), 27th October 1911 (*Ghosh*); ♀, Cherambadi (Wynaad), October 1913 (*Howlett*); ♀, 1,000—4,000 feet, Darjiling-Himalaya Railway, (Sikkim), 7th June 1922 (*Fletcher.*) Not very common in Ceylon. Apparently a Malayan form. (Plate II, fig. 3).

Strongyloneura viridana, Tnsd. In Pusa collection 24 ♂ 3 ♀, Muktesar (Kumaon, 7,500 feet), September 1922 (*Fletcher*). Found also in the Khasis, this species is apparently confined to the mountains of Northern India. (Plate II, fig. 2).

Strongyloneura cærulana, Tnsd. In Pusa collection, a ♀ from Kodaikanal, 1st October 1921 (*Fletcher*). Occurs sparsely in Ceylon. Apparently a Malayan form. (Plate III, fig. 4).

IDIOPSIS.

This Mediterranean genus is apparently represented in India by the following new species from the Western Himalaya.

Idiopsis argenticincta, sp. nov.

Male, female. *Head:* male frons reduced to a line; ocellar triangle black, elongate, ocelli amber-color; frons dark brown, parafrontalia below silvery-grey, pinched out above; face shining blackish, epistomal margin dull luteous; parafacialia silvery-grey, with a large dark brown spot in the middle; facial ridges flattened; genæ dark grey, with a large yellowish-brown spot anteriorly, but separated from the yellow of the epistomal margin by the dark grey of the peristomal border; frontal bristles long but fine; vibrissæ arising far above epistomal margin, nearly as high as the tip of antennæ. Antennæ short, the distance from their tip to the epistome being more than their entire length; arista long—pubescent above, only a few short hairs in middle below; upper eye-facets enlarged. Palpi black, barely clavate apically. Female frons exceeding an eye-width, the black parafacial fleck and yellow genal spot not prominent; upper half of parafrontalia shining black, the two together at least as broad as the frontal stripe. Upper eye-facets not enlarged. Two or three proclinate exterior frontals; otherwise as in male. *Thorax:* black

with greyish pollen. A girdle of silvery pollen from sternopleuron, across mesopleuron, dorsally, interior to humeral region, narrowed to posterior half of presutural area, across from side to side. The prescutellar area has some silvery pollen dorsally. *Chætotaxy:* Acrostichals 1 : 1; Dorsocentrals 2 : 3; Humerals 2; Presuturals 2; Notopleurals 2; Alars 2 : 2 : 1; Mesopleurals 1; Sternopleurals 1 : 1; Hypopleural fan strong. *Abdomen* shining black, no discals except on apparent fourth segment. *Legs* black, female tarsi barely widened, claws very strong, more so than in male. *Wings* infuscate along veins and with broad anterior dark stripe; fourth vein suddenly bent at rounded angle, but its last portion turning parallel to third vein, (which runs straight to margin), leaving first posterior cell well open. Anterior cross-vein below tip of first vein, but one specimen has a distinct adventitious cross-vein in both wings below the tip of the subcostal vein. Costal spine practically absent. No bristles on first or third veins. Tegulæ pale. Long 5·5 mm.

Described from one male, Simla, May 1918 (*Fletcher*), type, and two females, Muktesar, September 1922 (*Fletcher*), allotype and co-type, the first two in Pusa, the last in my own collection. The male is greasy, and the thoracic band is not apparent.

The species presents the following points of difference from the generic characterization:—the shorter plumosity of the antennæ and the lesser number of proclinate frontals in the female, but, until the genotype is further examined, it is unnecessary to erect a new genus for its reception on such differences.

METALLIOPSIS.

Metalliopsis setosa, Tnsd. In Pusa collection, a ♀, Kurseong, 7th to 20th June 1922 (*Fletcher*). In Biro collection 4 ♂, Singapore, 1898.

NITELLIA.

I place the following new species in this European genus with some doubt.

Nitellia khasiensis, sp. nov.

Female. *Head:* frons two-fifths of head width, exceeding that of either eye; frontal stripe black, bare, parafrontalia pale cinereous, both together not as wide as frontal stripe. Parafacialia and genæ pale cinereous, former with a touch of golden in a stripe from lower angle of eye to level of second antennal joint, both with sparse short black hairs, but below eye and more broadly along each epistomal margin a bare area, appearing more grey in

colour. Antennæ dark grey pollinose, arista with about eight short rays below. Palpi dark brown, not widened apically. *Thorax* dark grey with ashy pollen, scutellum and pleura similar. Presuturally four black stripes converging anteriorly. *Chætotaxy:* Acrostichals 1 : 3; Dorsocentrals 2 : 3; Humerals 2; Presuturals 2; Alars 3 : 1 : 2; Notopleurals 2; Mesopleurals 4-6; Sternopleurals 2 : 1; Scutellars an apical (crossed), preapical and 3 marginal pairs. *Abdomen* grey and black tesselate. *Legs* black. *Wings* clear, slightly yellowed on fore margin. Costal spine present, short. Third vein bristly on node only. First posterior cell very narrowed to petiolate, (in opposite wings of the same specimen). Long 5·5 mm.

Described from four females, Shillong, 4th to 20th October 1920, all in my own collection. This is the species referred to as "*Pollenia sens. lat.*" in my 'Diptera of the Khasia Hills.' Owing to the absence of the mesoscutal flat impression I am uncertain whether this species is correctly located, but, there being no facial carina that I can make out, it cannot fall into *Polleniopsis* with which it seems to have its closest affinity.

POLLENIA.

Pollenia rudis, F. When Townsend wrote this species was not known to be Indian, the Trans-Karakoram locality in Chinese Eastern Turkestan whence he recorded it being strictly Palæarctic. In the Calcutta collection I find 9 ♂, 'between Yangi-Hissar and Sirikol', (Yarkand Exped.), which are evidently part of the same material as the single specimen seen by Townsend, in whose paper 'Sinkol' is obviously a misprint. The reason why these further specimens were not included in the Rhiniine material sent to Townsend is that one of them bears a label in Bigot's handwriting "*Sarcophaga microstoma*, n. sp.," and they reached me among the Museum's collections in that genus, not as Rhiniinæ at all! I cannot find that Bigot ever described his "new species," and the *nomen nudum* can be forgotten. In addition to these specimens the Calcutta Collection contains a male from Jhelum Valley, Kashmir, 5,200 feet, July—September 1916 (*Pease*), which brings this species definitely on to the Indian faunal list. The palpi are yellow not black as in European specimens, but comparison of the genitalia of the specimen with such reveals that the two are conspecific. The palpi of the Pamir specimens are black. (Plate IV, fig. 7).

Receipt of the above-mentioned European specimens of *P. rudis* has enabled me to describe the following new species in the genus, which is so closely allied to *rudis* in appearance that, had not the genitalia proved different I should have hesitated to separate them.

POLLENIA INDICA, sp. nov. (Plate IV, fig. 8).

Male, female. *Head:* male frons about $\frac{1}{5}$ of head width, female greater than a third thereof; frontal stripe black, parafrontalia silvery-grey, in female each wider than the frontal stripe; face, genæ and occiput silvery-grey. Antennæ blackish, tip of second joint rufous, arista with rays shorter than in *rudis*. Palpi orange. *Thorax* and scutellum grey, with three ill-defined black dorsal stripes. Pleura lighter grey. *Abdomen* blackish with pale indefinite spots. *Legs* black. *Wings* clear, fourth vein more sharply angled than in *rudis*, and nodal bristles of vein III stronger. Squamæ dirty whitish. Long 10-11 mm.

Described from four specimens, Masuri, 7,500 feet (U. P.), bred from *Cedrus deodara* (R. R. D. 805, B. C. R. 140, Cage 113,—January 1921, S. N. Chatterjee), forwarded to me for determination by Mr. Beeson, Forest Entomologist, Dehra Dun. Type and allotype in my own collection, other specimens in Forest Collection.

DEXOPOLLENIA.

DEXOPOLLENIA HAZARÆ, sp. nov.

Female. *Head:* frons one-third of head width at level of antennæ, frontal stripe dark, with sparse scattered short black hairs; ocellar triangle and parafrontals with dull bronzy-gold pile; parafacialia, facial ridges and genæ similar, a large black fleck on first of these at half length and all with black hairs. Face black, epistomal margin yellow. Antennæ and palpi black, the latter subclavate. Epistome exceptionally developed, two-fifths of head height viewed laterally. *Thorax* dark grey, the fore margin narrowly shining black, and with four dorsal black stripes fading posteriorly. Scutellum and pleura concolorous, the whole thickly developed in dull golden woolly pile. *Chætotaxy:* Acrostichals 2 : 3; Dorsocentrals, 2 : 3; equidistant and parallel to these is another row, 2 : 3, made up of interior presuturals and supra-alars; Humerals 3; Presuturals (in all) 4; Alars (in all) 3 : 1 : 1; Notopleurals 2; Propleurals (strong) 2; Mesopleurals 2; Sternopleurals 1 : 1; Scutellars an apical, sub-apical and 3 marginal pairs. *Abdomen* grey-black tessellate, pattern changing according to light incidence. *Legs* black, coxæ, especially front pair anteriorly, with pollen similar to thoracic pile. *Wings* clear, veins bare, squamæ whitish. Long 8 mm.

Described from a unique female in perfect condition, taken at Abbottabad, 4,120 feet, October 1922 (*Dutt*), in Pusa collection.

The location of this beautiful new species in the present genus is not quite certain for the following reasons:— the specimen is newly emerged and

the parafacialia are so folded over the antennæ that the facial carinae annot be properly made out, but it appears to be present; the parafacials are hairy, not bare. Notwithstanding these differences, the lateral discals and the yellow srinkled pile of the thorax lead me to place the species here, at least provisionally, until the male is known.

In this sub-family I have so far avoided new generic erection, and equally have not yet sunk any of Townsend's genera. The result of excessive splitting, of which Townsend is the High-Priest, must ultimately be the multiplication of genera until practically every species has its own genus, or else the flood must be stemmed by meting out to many such genera the fate of their Culicid relations erected by Theobald. Such is my ultimate intention, but before doing so it is necessary to arrive at some approximate finality in regard to the tale of the species, and that is obviously not yet attained.

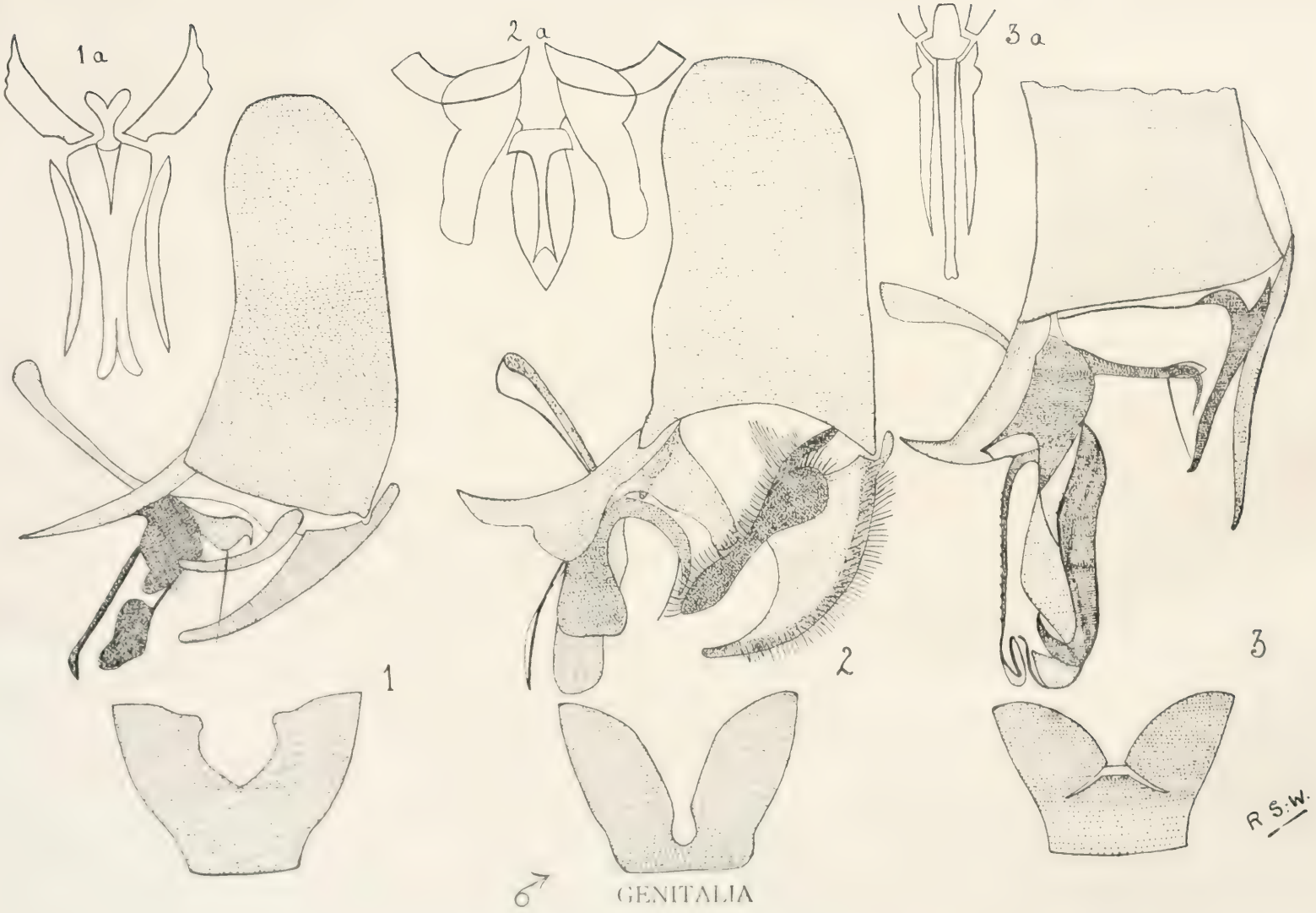


Fig. 1. Strongyloneura nepalana, Townsend.
Fig. 2. Strongyloneura viridana, Townsend.
Fig. 3. Strongyloneura nebulosa, Townsend.
(Figs. marked "a" are end views.)

PLATE II.

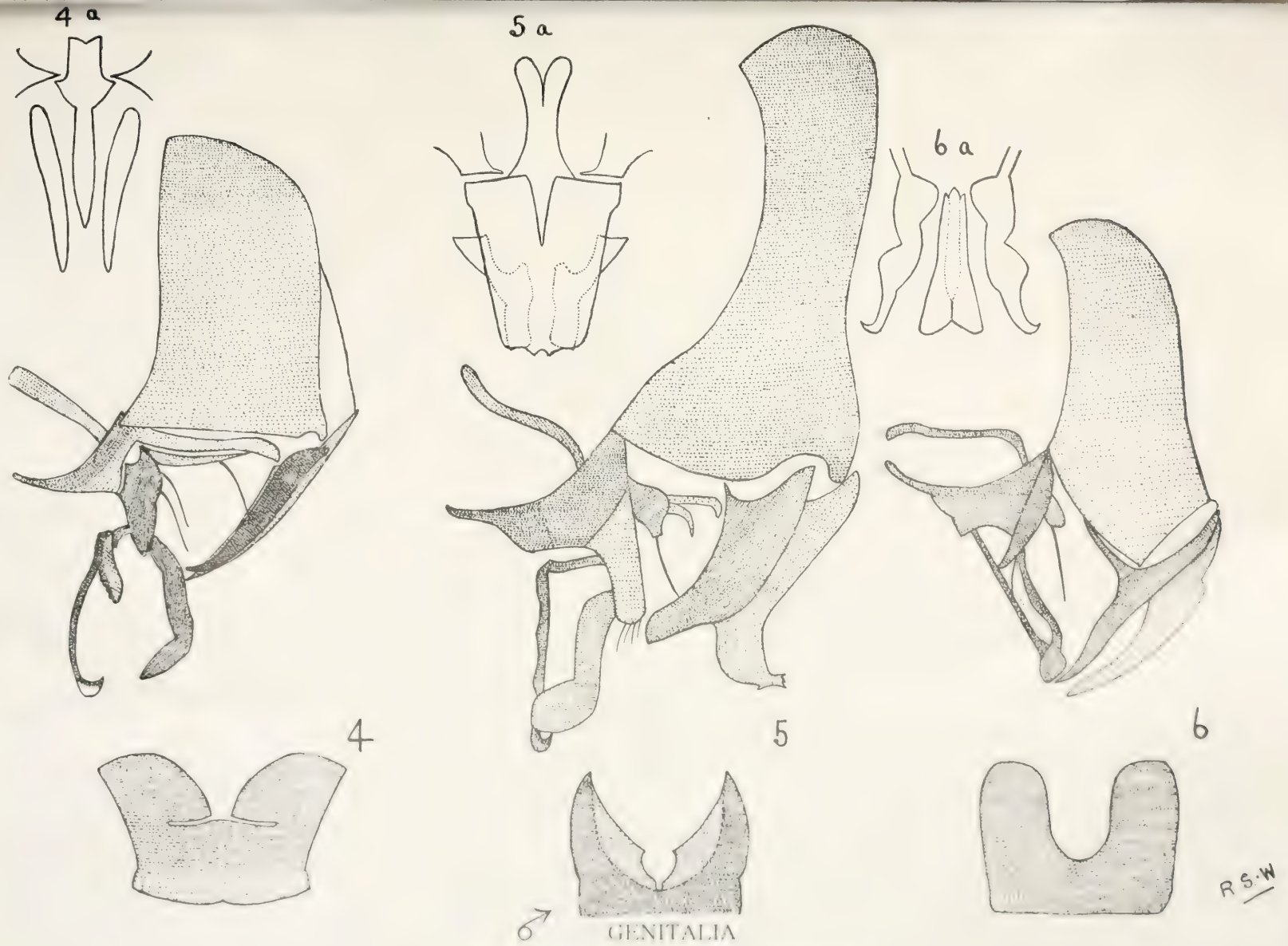
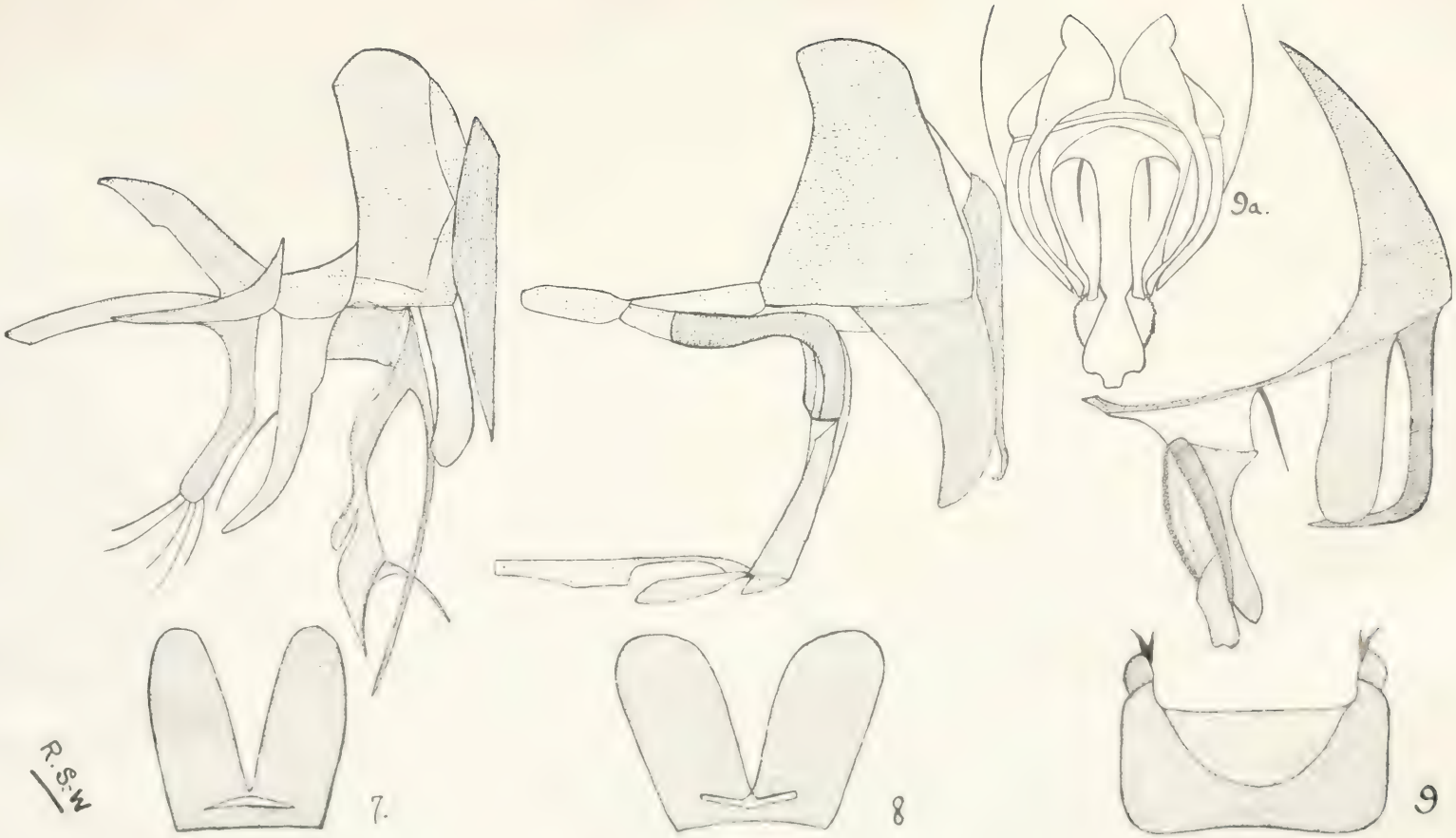


Fig. 4. Stongyloneura cerulana. Townsend
Fig. 5. Synamplemura cuprina. Bigot
Fig. 6. Cosmina indica Senior White.
(Figs. marked "a" are end views

PLATE III



♂

GENITALIA

Fig. 7. Pollenia rudis, Fabricius.
Fig. 8. Pollenia indica, Senior White.
Fig. 9. Rhina testacea, Robineau-Desvoidy.
(Figs. marked "a" are end views.)

PLATE IV.

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